

Explaining public and private services growth in the enlarged EU

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Abstract

This paper complements a large body of literature on structural change and underlying factors for the expansion of services. The main aim is to explore the determinants of the employment growth in the enlarged EU from the perspective of various service groups - public, private and mixed services and to identify which factors played the most significant role in the period 1995-2007. The role played by standard determinants, the state, social and demographic changes, institutional framework of labor markets and membership to old EU15 considerably differ across service groups.

Key words: public services, private services, employment, structural change.

1. Introduction

Service activities dominate the sectoral structure of developed economies and are an essential building block for any competitiveness strategy. This is a stylized fact for the most advanced European economies and for the transition countries that recently joined the EU. Beyond sectoral divisions, service functions are nowadays crucial actors in every production process. Therefore, understanding the underlying factors of their growth across the old European economies (EU15) and the new member states (NMS) is a step towards the full comprehension of the dynamics of the EU tertiarization process.

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Along with the growth process of service activities, governments' role has changed dramatically during the past decades in both parts of the enlarged EU. The main factors explaining this are the changes that occurred within the socio-economic system, on the one hand, and the transformation of regulatory schemes, on the other. Notably, it is worthwhile observing that prior to the 1990s the EU15 had a well-established market system while the NMS were centrally planned economies⁴ with over-employment in industry compared with market economies at a similar level of income. In general, most services were provided by the public sector while private suppliers hardly existed prior to the transition. Moreover, many sectors traditionally operating under public monopolies or protectionist regulations have been deregulated, privatized or liberalized in old and new EU economies alike. Since these changes have particularly affected service activities it is interesting to analyse the determinants of their growth, not only from an aggregated perspective but also from a sectoral dimension that considers the nature of the provision.

Within this context, the paper complements a large body of literature on structural change and the underlying factors for the expansion of services. The main research hypothesis tackled is that the role played by supply and demand factors and other potential determinants in explaining services' employment growth may to some extent differ between private, public and mixed services. The relative productivity gap (Baumol, 1967 and 1985), an increase in income (Clark, 1957; Bhagwati, 1984 and 1985; Francois and Reinert, 1996) and other potential determinants such as institutional frameworks, demographic developments and broader social considerations may explain the growth of services in modern economies. This paper studies if their roles differ between public and private services. While previous works on this topic have focused on studying OECD economies (OECD, 2000; Messina, 2004), EU15 countries (D'Agostino et al., 2006) or EU10 nations (Stare and Jaklič, 2009), this study extends the analysis of the determinants of structural change towards service employment growth to the enlarged European Union (EU27).

The paper is organized as follows. After this brief introduction, the next section analyses the theoretical background of the determinants of services growth and related stylized facts in

⁴ Cyprus and Malta were exceptions to this.

developed and transition economies. Then, the determinants of employment growth in the enlarged EU are empirically tested using a panel data set available for the period 1995–2007. The econometric model is estimated for the aggregate service sector and two categorizations of services defined as public and private services, on the one hand, and public, private and mixed services, on the other. Besides a core set of variables whose impact on services employment is confirmed to be significant (GDP per capita and lagging productivity in services), the impact of other factors that may also exert an influence on services' employment growth is tested. Specifically, variables reflecting the role of the state; social and demographic changes; the institutional framework of labour markets; potential sources for services' comparative advantage; and differences arising from EU15 membership are included within the estimations. Finally, the results are discussed and possible lines of further research are outlined.

2. On the Growth of Services

2.1 Theoretical Background of the long-term Growth of Services

The increasing share of the service sector in developed economies has given rise to exploring the factors that lie behind the expansion of service sector employment. A large number of scholars contributed to the evolution of economic thought on the causes of the tertiarization process;⁵ however, it appears that two fundamental lines of argumentation dominated the discussion for a long time and were considered sufficient to explain the long-term structural evolution (Rowthorn and Wells, 1987). They could be summarized as the demand and supply approach to explaining the growth of services. The first one originates from the pioneering work by Clark, who argued that the main reason for the shift in employment towards services relates to the change in the composition of demand. In line with 'Engel's law', households with higher incomes spend proportionately less on primary products; similarly, the saturation phenomenon arises eventually with secondary products, to the benefit of spending for services (Clark, 1957). Accordingly, the growth of service employment is mainly explained by the shifts in income elasticity of the final demand. As a matter of fact, the most commonly used explanations relate services' growth to income growth and one of the stylized facts of

⁵ For an overview see Messina (2004) and Maroto (2009).

economic development is that the share of services in GDP and employment rises as the per capita income increases (Samuelson, 1964; Bhagwati, 1984, 1985; Francois and Reinert, 1996). Nevertheless, some scholars questioned the standard hypothesis on the relationship between GDP per capita growth and the share of service employment as long ago as the early 1950s, without clearly specifying the activities to which it refers (Delaunay and Gadrey, 1992). Singlemann was among the first to claim that 'Clark's law' applies to some services but not to others, and proposed distinguishing between four subgroups of services (distribution services, producer services, social services and personal services) (Singlemann, 1974). This reasoning indicates that dealing with services as a uniform category might hide the growth patterns of different services.

Another standard explanation for the rising share of services in employment and output claims that the supply-side factors are responsible for the growth of services and this is most clearly recognized as Baumol's 'cost disease'. In his simplified model of unbalanced growth Baumol argued that the productivity growth in services is slower than in manufacturing, which applies capital and technology to a larger extent than services. Consequently, the labour force is relocated to the lower productivity sector. In the long run the productivity differential between the sectors slows down the total aggregate growth (Baumol, 1967). The interpretation of the productivity gap was later altered to accommodate the implications of advanced technology for the transformation of service activities, in particular in transport, financial services, telecommunications and distribution (Baumol et al., 1985). It points to the fact that the second standard reference for the explanation of service employment growth also had to recognize the diversity among service categories. Rubalcaba (2007) and Maroto and Cuadrado (2006) have noted that the negative relationship between relative productivity growth and relative employment share in the services sector may be critically assessed on the basis of the following arguments:

- The problems related to the concept and measurement of service productivity (Gadrey, 1996, Rubalcaba, 1999 and 2007, Rubalcaba and Kox, 2007). These are particularly important in the case of public services for which the information on prices is not available and the output is difficult to define (Djellal and Gallouj, 2008);

- The role played by other factors (apart from labour force) in services productivity growth (De Bandt, 1989, Kox, 2002);
- The increasing use of services as intermediate inputs (Oulton, 2001, Kox and Rubalcaba, 2007);
- The impact of information and communication technologies (ICT) in services returns of scale (O'Mahony and van Ark, 2003; Stiroh, 2001; Wölfl, 2003).

Even though both paradigms attracted substantial support and the refined argumentation of scholars, the large heterogeneity of services and the new dynamics of services' development pointed to additional factors that influence services' growth. In particular, a derivative of the demand-side approach emerged, suggesting that intermediate demand for services is an important determinant of service employment growth (Stanback, 1980; Momogliano and Siniscalco, 1982; Oulton, 2001). In fact, this factor has emerged as the main source of growth for some service categories, such as business services (Savona and Lorentz, 2009). Intermediate demand is spurred by a more complex labour division, increasing specialization, technological progress and organizational change with local and global outsourcing of services by manufacturing and service firms (Wölfl, 2005). More recently, the outsourcing of services has become an important feature of public sector organizational change as well (Montresor and Marzetti, 2010). In addition, researchers have suggested that increased competition between service suppliers on a global scale, the institutional framework, demographic developments and broader social considerations reflecting the welfare state are important drivers of service employment (D'Agostino et al., 2006). Finally, based on an extensive survey of the literature, Maroto summarized that services' growth is linked to changes in four areas: production factors (mainly labour and human capital); productive systems (flexibility and goods-services integration), markets (international trade and investment) and income; and the role of the state (institutional system, public services, regulations) (Maroto, 2009).

2.2 Stylized Facts on Service Employment Growth in Developed and Transition Economies

A number of studies engaged in the empirical testing of the factors that could explain the rising share of services employment. Mostly, the analyses relied on data for developed economies and confirmed the impact of different factors and particularly the combined effect of some of them. The per capita income, the size of the welfare state and the extent of female employment were found to be the main drivers of service employment growth in OECD economies in the period 1984–1998, along with some other factors such as labour market institutions (OECD, 2000). Also, the study by Messina reveals a positive and statistically significant impact of per capita income, the size of the public sector, the productivity differential between services and manufacturing, the investment rate, the degree of urbanization and a negative impact of the administrative burden on the creation of new firms on service employment for the sample of 27 OECD economies for the longer time period (1970–1998). However, a non-significant effect is found for variables such as female employment, employment protection legislation, trade specialization in services or secondary education (Messina, 2004). Those studies treated services as a homogenous category and did not investigate whether there are any differences among various service activities.

Based on the inter-sectoral analysis of disaggregated subsectors,⁶ Diaz-Fuentes proposed that since 1975 market service employment in major EU economies grew mainly as a result of the intermediate and not the final demand (Diaz-Fuentes, 1999). D'Agostino et al. extended the examination of the determinants of service employment growth in such a way as to capture the heterogeneity of services (four service subsectors and twelve branches) and a broader set of determinants. The study confirmed that GDP per capita is the strongest explanatory factor for service employment growth in the EU15 in the period 1970–2003 and this is valid for all service subsectors and branches as well. The productivity growth differentials between services and manufacturing also affect employment growth in services, but to a much lesser extent than government consumption. Beyond these three core variables a number of labour market institutions exert a significant effect on service employment (union density, employment

⁶ Agriculture, energy, manufacturing, building, wholesale and retail trade, market services and non-market services.

protection legislation, wage bargaining centralization). Similarly, the vacancies to unemployment ratio and the skill level of the labour force significantly influence the service employment share, particularly in producer services (D'Agostino et al., 2006).

The analyses of the tertiarization process in the former socialist economies pay little attention to empirical investigation of the determinants of services employment growth even though the adjustment process initiated by the implementation of market reforms brought about profound shifts in the employment structures. The most significant refers to the huge downsizing in manufacturing and growth in services employment. The catching-up process differed substantially across countries and across service activities, owing to different starting positions and the efficiency in implementing the reforms. The convergence analysis by Burger and Stare points to a more rapid catching up of CEECs in private services than in public services in the period 1995–2005, which is in line with the different developments of the two groups of services in the past. In particular, the over-employment in public services relative to their levels of per capita GDP was a common feature of a number of CEECs at the outset of reforms (Burger and Stare, 2010).

To acknowledge the heterogeneity of services employment growth Table 1 analyses the changes in three categories of services for old and new member states in the period 1995–2007. Following Rubalcaba and Di Meglio (2009), besides public and private services, a third category of services is introduced, taking into account that some services have mixed properties and can be provided by public and/or private suppliers. The NMS experienced faster growth in private and in public services employment relative to the EU15 in the period under observation whereas employment in mixed services declined in the former and increased weakly in the latter. The NMS recorded the largest gap in private services employment compared with the EU15, due mainly to the low employment share in business services categories. There is almost no difference regarding the employment share in public services defined narrowly (only public administration) between old and new member states while mixed services displayed a gap in the NMS employment share relative to the EU15, particularly in health services. However, the result varied across service activities.

Table 1. Share of services in employment, 2007 and annual growth rate 1995–2007

	NACE	Share in 2007, %		AGR 1995–2007	
		EU15	EU10*	EU15	EU10*
Private services		38.3	30.0	1.1	2.1
Distributive trades	G	15.0	15.9	-0.1	1.3
Hotels and restaurants	H	5.0	2.8	1.4	2.0
Water, air transport, other supporting activities	61-62-63	1.7	1.1	1.8	1.5
Financial services	J	2.9	2.2	-0.6	1.4
Real estate, renting and business activities	K	13.7	8.0	3.1	4.5
Public services	L	6.6	6.4	-1.1	0.9
Mixed services		27.9	21.8	0.5	-0.3
Education	M	6.7	7.2	0.3	0.1
Health and social work	N	9.8	5.6	0.8	-1.3
Other community, social and personal services	O	4.9	3.6	1.1	0.8
Private households with employed persons	P	2.5	0.1	1.4	5.4
Post and telecommunications	64	1.4	1.4	-0.8	-0.8
Other inland transport	60	2.5	3.8	-0.8	-0.7

Notes: * Member states that joined EU in 2004, without Bulgaria and Romania. Source: Based on EUKLEMS Database and Eurostat.

Studies that explored the drivers of structural change in CEECs in favour of services argued that the overall growth of the service sector during the transition can be attributed to the combination of the following factors: market-oriented reforms (privatization, regulatory reform, liberalization), institutional change, per capita growth, technological modernization and related adjustment of industrial production and business processes, organizational change towards the externalization of non-core services,⁷ increased intermediate demand for services and the growth of consumer demand for services reflecting both a large shortage in this field in the past and increased income (Vidovic, 2002; Stare, 2007). The econometrical analysis by Mickiewicz and Zalewska explored the determinants of shifts in the employment structure in transition economies⁸ in the period 1997–1999. Apart from per capita income, they included the variation in the current levels of economic activity, foreign trade intensity and the efficiency of reforms (approximated by the EBRD transition index) as explanatory factors. Their empirical

⁷ It needs to be taken into account that under the previous socio-economic system a large part of transport, distribution, catering, maintenance and other services was carried out within industrial conglomerates. With market-oriented reforms many of these service activities were organized in independent firms (the process of externalization) and statistically registered as service activities. Accordingly, the dynamic growth of value added and employment in services could to a certain extent also be the result of the statistical realignment of activities (Stare, 2007).

⁸ The analysis includes CEECs, candidate countries and some CIS countries (Moldova, Ukraine, Russia).

analysis confirmed a statistically significant influence of GDP per capita⁹ on service employment and a positive influence of reforms that is however only marginally insignificant (Mickiewicz and Zalewska, 2002:23). They argued that the higher the quality of reforms, the deeper the structural adjustment towards more efficient labour allocation, where the service sector grows and the agricultural sector decreases (Mickiewicz and Zalewska, 2002:28–29).

In exploring the patterns of private and public services¹⁰ transformation in the NMS, estimations by Stare and Jaklič brought about somewhat surprising results on the determinants of services employment growth in the period 1995–2007. Basically, it turned out that GDP per capita and government expenditure fail to explain the increasing share of services employment in the NMS, while only the productivity gap between services and manufacturing appears to be a statistically significant determinant (Stare and Jaklič, 2009). In line with the expectations, transition reforms exert a statistically significant influence. Stare and Jaklič claimed that these results appear more credible when perceived through the lens of the convergence patterns of the two major service groups. They point to the over-employment in public services in these countries at the start of the transition and hence their disproportionate share in the total employment relative to the income level (Burger and Stare, 2010). Taking into account this feature, it becomes more plausible that income growth per se could not reveal positive impact on the public services employment share. However, income growth was the most important determinant of the increasing share of private services employment in the NMS in the period 1995–2007. Acknowledging the fact that many services are provided by both public and private suppliers the authors introduced a distinction among public, private and mixed services¹¹ to gain further insight into the explanatory determinants of services employment growth. It turned out that mixed services employment is driven primarily by transition reforms while the latter appear to be insignificant for market services. Stare and Jaklič conclude that these findings do not suggest that standard explanations of services' growth and stylized facts of structural

⁹ The initial level of GDP per capita in 1989 serves to reflect the structural position of the country at the outset of reforms.

¹⁰ Private services are approximated by market services and public services by non-market services.

¹¹ Public services: public administration and defence; mixed services: education, health and social work, other community, social and personal services, post and telecommunications, inland transport; private services: distributive trades, hotels and restaurants, water and air transport, financial services, real estate, renting and business services.

change are not valid for NMS. The results based on the available data rather indicate that past developments in the NMS in regard to different service categories and the transition process disrupt the explanatory power of the standard variables for services' growth in the NMS (Stare and Jaklič, 2009).

In the next section, the drivers of services employment growth in a united set of countries belonging to the enlarged EU are investigated in order to check the validity of the standard theories of structural change and the determinants of services employment growth.¹² The proponents of supply and demand driven explanations of services' growth have recognized the potential drawback of their explanations for individual categories of services that have been addressed by some scholars. This paper contributes to overcoming this gap further by taking due account of the heterogeneity of services in the enlarged EU.

3. Testing the Determinants of Service Employment Growth in the enlarged EU

In order to capture the different nuances that are currently present in the public/private services debate, this paper uses two categorizations of tertiary activities: a) private and public services¹³; and b) private1, public1 and mixed services (see Table 1). We assume that private services are characterized by competitive markets, while public services are heavily regulated and predominantly financed by public funds. Mixed services represent a hybrid set of activities that are supplied by private companies and/or public institutions, involve the use of public funds and are heavily regulated. In mixed services non-competitive market areas coexist with competitive ones (for example, post and telecommunications)¹⁴.

The econometric analysis of the determinants of services employment growth in the categories previously described is performed for EU27 countries using a panel data set available

¹² The NMS also include Cyprus and Malta, which were excluded from a set of NMS analysed by Stare and Jaklič (2009).

¹³ Private services are approximated with data for market services employment such as: distributive trades, hotels and restaurants, transport and communications, financial services, real estate, renting and business activities. Public services are estimated with data for non-market services employment including: public administration, defence and compulsory social security, education, health and social work, other community, social and personal services and private households with employed persons.

¹⁴ It is acknowledged that in many countries the government is still involved in postal activities, while telecommunications are largely privatized. However, the level of disaggregation of the data available prevents us from taking these differences into account and dealing with two separate subsectors. Inland transport comprises road and rail transport. While in the former private companies prevail, in the latter the state is still closely involved in service supply in many countries. However, these differences cannot be taken into account since disaggregated data are not available.

from 1995 to 2007. In this way, we are able to consider both the space and time dimensions of data in order to study the dynamics of change of services employment across countries over the time span analysed. The chosen time period attempts to capture the years in which the adjustment process initiated by the introduction of the political changes and the implementation of market reforms had brought about shifts in the employment structures of the NMS. Also, as Stare and Jaklič (2009) note, since 1995 the economic restructuring as well as productivity and technological catching-up, were occurring fairly simultaneously across the NMS¹⁵.

3.1 The Model

In order to study the impact of macroeconomic and institutional factors on the service sector employment, a panel data model for an unbalanced sample of 27 European countries¹⁶ in the period 1995–2007 is estimated. The following regression model is considered:

$$\begin{aligned}
 y_{it} &= c + \beta x_{it} + u_{it} & i &= 1 \dots N & t &= 1 \dots T_i(1) \\
 u_{it} &= \alpha_i + \varepsilon_{it} & & & & (2)
 \end{aligned}$$

where ε_{it} is assumed to be normally distributed and such that:

$$\begin{aligned}
 E(\varepsilon_{it}) &= E(\alpha_i) = 0 \\
 E(\varepsilon_{it}^2) &= \sigma^2 & E(\alpha_i^2) &= \sigma_{\alpha}^2 & E(\alpha_i \varepsilon_{jt}) &= 0 & \forall i, j, t \\
 E(\varepsilon_{it} \varepsilon_{js}) &= 0 & \text{if } t \neq s & \text{ or } i \neq j \\
 E(\alpha_i \alpha_j) &= 0 & \text{if } i \neq j.
 \end{aligned}$$

N is the number of countries (up to 27 countries) and T_i is the sample length in country i . The left-hand-side variable y_{it} is the $((T_1 + \dots + T_N) \times 1)$ vector of services employment shares, while x_{it} is the $((T_1 + \dots + T_N) \times K)$ matrix of determinants. Furthermore, the country-specific unobservable effect α_i is assumed to be randomly distributed across the cross-sectional units,¹⁷ as confirmed by the results of the Hausman's (1978) test.¹⁸ The model is estimated by Feasible Generalized Least Square (FGLS) accounting for the heteroskedastic error structure across

¹⁵ However, it would also be interesting to compare results with a later time period of analysis (e.g. 2000–2007) in which reforms and changes in NMS have already been consolidated.

¹⁶ D'Agostino et al. (2006) estimated a similar model for the EU15 excluding Ireland and Luxembourg.

¹⁷ The OECD (2000), Messina (2004) and D'Agostino (2006) also estimated random effect models.

¹⁸ The Breusch and Pagan (1980) Lagrangian multiplier test for random effects is also estimated. In some specifications a generalized version of the Hausman test is estimated through the test of orthogonality conditions by Sargan-Hansen.

panels and first-order autoregressive autocorrelation disturbances.¹⁹ In particular, it is assumed that:

$$\varepsilon_{it} = \rho \varepsilon_{it-1} + \eta_{it} \quad (3)$$

where $|\rho| < 1$ and η_{it} is independent and normally distributed with zero mean and variance σ^2 .

3.2 Description of the Variables

The service employment share (y_{it}) is, firstly, observed for total services and two sub-categories, public and private services, and, secondly, for three sub-categories: public, private and mixed services. As in other previous studies (Messina, 2004; D'Agostino et al., 2006) estimation is carried out by selecting a core model, which includes a limited number of determinants, and by gradually adding other potentially relevant explanatory factors. The core model includes the following set of explanatory variables²⁰:

- GDP per capita at constant prices and current PPPs.²¹ The cycle component is also included within the estimation in order to capture short-term fluctuations which may be an important component affecting the employment share dynamics.
- The productivity gap between services and manufacturing (the labour productivity in services relative to the average labour productivity in manufacturing).²²

Additionally, we test the impact of other potential explanatory factors, such as:

- Government final consumption and tax revenue, both as a percentage of GDP. These variables approximate, to a certain extent, the role played by the state in the different service categories analysed.
- The urbanization rate, female participation in the labour force and households' final consumption (as a percentage of GDP, as a proxy for private consumption). In a way,

¹⁹ Wooldridge's (2002) test for serial correlation in linear panel data models and Levine's robust test for the equality of variances between groups as well as Brown and Forsythe alternatives are implemented. No cross-sectional dependence in error terms is detected on the basis of the test proposed by Friedman.

²⁰ See Appendix 1 for data description (definition and sources).

²¹ The smooth time series were obtained by applying the Hodrick-Prescott Filter. Ravn and Uhlig (2002) suggested setting the smoothing parameter (λ) to 6.25 for annual data.

²² This definition counts persons, not hours worked; therefore, it could underestimate the productivity growth if the share of part-time workers grows over time. It may also cause difficulties in cross-country comparisons of productivity since the employment patterns vary between countries.

these factors reflect the impact of social and demographic changes on the shift to services.

- The strictness of employment protection legislation (EPL) and trade union density account for the potential impact of labour market institutions on service employment. While the former controls for adjustment costs in the labour market, the latter is an indicator of union bargaining power. The OECD (2000) and D'Agostino et al. (2006) showed that under relatively strict EPL for contracts, dismissal costs are high and these may hinder the reallocation of employment, affecting negatively the expansion of dynamic service sectors. In a similar way, a higher degree of union density may compress wage distribution, preventing the creation of low-wage jobs, which eventually affects negatively the development of some service activities (Messina, 2004).
- Three variables are included in order to account for possible sources of comparative advantages in tertiary activities. The ratio of service trade relative to total trade controls for direct external trade specialization. Foreign direct investment inflows as well as differences in the population with secondary education are also considered. If the average level of skills demanded in some service activities is higher, then it is likely that human capital accumulation will eventually impact on the expansion of service employment.
- The membership of 'old' EU countries (EU15) or 'new' ones (EU12) will probably affect service employment dynamics due to the different roles played by the past socio-economic system, development level, structure of the economy and changes since the beginning of the 1990s in both parts of the enlarged EU. Therefore, a dummy variable reflecting EU15 membership is also included as a potential explanatory variable.

3.3 Empirical Findings and Discussion of the Results

Table 2 shows the results for the determinants of total services employment share and the different categories under study in the EU27. When analysing the results for the total services sector, the first feature worth noticing is the verification of the positive association between the GDP per capita and the services employment share in the enlarged EU. The results

also confirm that a decrease in productivity in services relative to manufacturing is associated with a higher employment share in the total services. As in D'Agostino et al. (2006), this effect seems to be smaller in magnitude in comparison with the indicator of total output. Moreover, the cyclical component of GDP is also a significant factor negatively affecting the overall services employment share. Government consumption does not appear to be a significant determinant explaining the total services' expansion; a result that contradicts the results found in previous studies for different subgroups and time periods. In a way, the impact of this variable may be blurred due to the heterogeneous and changing role of the state within the enlarged EU in the context of transition reforms (privatization, deregulation and liberalization processes) that have occurred in the period under analysis in the NMS. Also, the impacts of various approaches on the modernization of the public sector and the improvement of its efficiency in the EU15 in the period 1995–2007 may have influenced the results.

Table 2. Determinants of employment in service categories, EU27

	Total services	Private services	Public services	Private 1 services	Public1 services	Mixed services
GDP	0.156***	0.393***	0.0131	0.433***	-0.538***	0.077
Cycle	-0.174*	0.236	-0.853***	0.346	-10.06**	-0.645*
Productivity gap	-0.0457**	0.0644*	-0.0616	0.0464**	-0.227***	0.0383
Gov cons	-0.0173	-0.0162	-0.0194	0.0963***	-0.0659	-0.197***
Urbanization	0.344***	0.311***	0.332***	0.277***	0.518***	0.339***
Female part	0.274***	0.0565	0.648***	-0.185***	-0.0287	0.875***
House cons	0.0648	0.259***	-0.106	0.361***	0.0403	-0.314***
Trade spec	-0.0137	-0.0341**	0.0021	-0.0448**	-0.137***	0.0487*
FDI	-0.00074	-0.00044	-0.00105	0.00012	-0.00293	-0.00243
Human capital	0.00485	0.00499	0.0133	-0.0218*	0.0606*	0.0215
Tax revenue	0.0593*	-0.169***	0.255***	-0.176***	0.22*	0.319***
EPL	-0.0157***	-0.0301***	-0.00396	-0.0549***	0.0684***	-0.0139
Union density	-0.0248***	-0.0396***	-0.00599	-0.0614***	-0.0623*	-0.00124
EU15 membership	0.117***	-0.0449	0.248***	-0.0239	0.448***	0.143*
Constant	10.02**	10.02**	-0.947	0.877*	10.69	-10.5
chi2	1781	1781	431	3216	100	613
N	127	127	127	127	127	127
Hausman (P > X2)	0.9991	0.0004	0.9980	0.0000	0.0002	0.0417

Notes: * p<0.05; ** p<0.01; *** p<0.001.

From the set of variables referring to social and demographic changes, female participation in the labour force and urbanization turn out to be significant and positively associated with the total services employment share. Urbanization appears to play a relevant role in the tertiarization process; a percentage point increase in the population living in urban areas would result in a 0.34 percentage point expansion of the EU27 services employment share. Note that the set of variables related to a potential comparative advantage in service trade, FDI or human capital are all non-significant. On the other hand, the employment share in services is positively affected by tax revenue although the impact of this variable differs considerably across categories as will be analysed later. These estimations confirm a fact that has already been proven for the EU15 countries (D'Agostino et al., 2006): institutional aspects of the labour market, such as employment protection legislation (EPL) and union density, are significant factors hampering the growth of the services employment share in the enlarged EU. Another interesting result may be observed in Table 2: belonging to the 'EU15 club' seems to be a relevant determinant stimulating service employment. In a way, this outcome reflects the role of path dependency in explaining the dynamics of service employment across the enlarged EU. In particular, the past socio-economic system, development level and changes since the beginning of the 1990s appear to condition the development of service activities within the EU12 countries (Stare and Jaklič, 2009).

When analysing the determinants of services employment from the perspective of public/private services' distinctions, some interesting features may be noted. First, GDP per capita emerges as a significant explanatory factor of the employment share in private service activities while it is not significant for public services, which are affected mainly by the cycle component. At lower levels of aggregation output emerges as particularly strong factor stimulating real estate, renting and business activities employment shares.²³ Despite the fact that Baumol's theory on the productivity gap is confirmed for the aggregate service sector, this is not the case for the private service category. In fact, a positive and significant relationship between relative productivity in services and private employment shares is found. This could be

²³ Estimations have been performed also for individual service sector. They are not included in the paper due to limited space.

explained by the role played by some capital intensive-service sectors, which are mainly used as intermediate inputs (logistics, transport and communications).

For public services, the productivity gap does not emerge as a significant determinant. However, as mentioned previously traditional productivity measures, such as the one used in this analysis, may not be entirely appropriate for public services. Urbanization stimulates employment shares in both private and public service categories.²⁴ While households' consumption positively affects the former (particularly in the case of hotels and restaurants), female participation in the labour force plays a role in the latter (mostly in health and social work). Interestingly, trade specialization in services appears to be negatively associated with private employment shares. Most likely, employment growth takes place through another form of internationalization such as FDI in services. However, the inclusion of this variable in our model has been restrained by data availability. The estimations for total FDI as well as human capital are not statistically significant. As expected, the influence exerted by tax revenue notably differs between the two categories under study; it hampers private services employment expansion while the opposite occurs in the case of public services, which are mainly financed via taxation. The strictness of EPL and the degree of union density seem to affect private service employment negatively.²⁵ On the other hand, they are not significant determinants of public services employment growth. EU15 membership positively and significantly affects the development of public services employment. This result is in line with previous studies that showed that past developments and transition reforms in the NMS have particularly affected the patterns of employment growth in public services (Stare and Jaklič, 2009).

The division of services into two major groups – public and private services – is not sufficient to address the mixed character of some services that pertains to their supply by both private and public providers. When considering private1, public1 and mixed service categories the following features may be noted. First, this narrower classification of private services only differs from the previous one in the role played by government consumption, female

²⁴ In particular, it plays an important role in real estate and business services and financial activities.

²⁵ These variables play a strong role in sectors intensive in low-skill labour, such as hotels and restaurants, and also in real estate and business services and financial services.

participation in the labour force and human capital. It is worth noting that private services taken narrowly are found to be influenced by the largest set of variables and mixed services by the lowest.

Although the most important factor explaining job creation in the narrow group of public services comes from the supply side, it needs to be emphasized again that traditional productivity measures may fail to account for the productivity growth of public administration. The productivity gap has the largest effect on employment development, which is in accordance with Baumol's traditional assumptions. Interestingly, GDP per capita appears to be negatively associated with the employment dynamics in this group of public services. The result might reflect public administration employment experiencing slower growth than per capita income within the enlarged EU (which is in line with Burger and Stare's (2009) findings). It might also reflect the drive towards improved efficiency of public administration in the EU15. In addition, the results show that urbanization, human capital and tax revenue are important drivers of public administration employment expansion. Interestingly, strict employment protection legislation for public servants appears to stimulate jobs within public administration while union density has the opposite effect. Another important determinant of job expansion in this category is EU15 membership. This factor is also relevant to mixed services' development along with tax revenue, trade specialization, female participation in the labour force and urbanization. Besides, government consumption and households' consumption seem to be negatively related to mixed service employment shares. This result may somewhat reflect the changing roles of the state and of the private sector during the past years in which privatization, deregulation and liberalization took place in the provision of these services. It should also be noted that mixed services are not affected significantly by labour market institutions.

The regression results are subject to several caveats. First, the random effects model does not seem to fit well in every category under analysis. As may be observed in some service categories, the Hausman test suggests that the hypothesis of consistency and efficiency of random effects can be rejected.²⁶ Second, endogeneity bias is a likely problem of the model

²⁶ This is particularly the case for private and mixed services and thus those results should be interpreted with caution. Further research is needed in order to explore other model specifications in the different service categories and the role played by country-specific effects as a potential explanatory factor.

since an element of mutual causation may exist between service employment shares and several of the regressors, such as female participation in the labour force and urbanization. Finally, multicollinearity is another potential problem that makes it difficult to differentiate clearly among the effects of the regressors. It would also be important to test the role played by certain variables, such as product market regulations, FDI in services or tax on service activities, although in many cases data availability restrains this analysis.

4. Concluding Remarks

The analysis of the determinants of services employment growth in the enlarged EU clearly reveals different impacts for service subgroups that reflect the properties and the patterns of transformation in private/public services on one hand, and in private/public/mixed services on the other hand. Evidently, GDP per capita turns out to be a key determinant explaining employment growth in services. A more detailed analysis, however, reveals that it stimulates primarily employment in private services while this effect is not verified in public or mixed services. To the contrary, the income level negatively affects public administration job expansion which is in accordance with the results of some previous studies. Employment in public and mixed services is comparatively more sensitive to short-term GDP fluctuations, with public administration being the most sensitive category to cycle. Whereas the relative lag in service productivity explains employment expansion in the aggregated service sector it is not confirmed in private services. It appears that this effect could be attributed to the role played by some capital-intensive service sectors where productivity growth is fairly dynamic (e.g. logistic and transport services).

When analysing the impact of the role of the state, two interesting outcomes are found. First, the influence of government consumption on services employment seems to be somewhat blurred by the changing relationships between public and private sectors arising from the privatization, deregulation and liberalization processes, which particularly affected the provision of mixed services. Second, tax revenue has a differentiated impact on service categories. As expected, it deters employment growth in private services, but encourages employment expansion in public services, public administration and mixed services. Those services are

mainly financed by taxation. Among the variables reflecting social and demographic changes, urbanization emerges as the most significant factor influencing services employment growth in every service category analysed. The migration of the population to urban areas increases the demand for diverse services and, accordingly, creates jobs in service production. In addition, female participation in the labour market is important for public and mixed services employment growth.

Labour market institutions, such as employment protection legislation and union density, are not neutral for the growth of services. Moreover, they act as a barrier to employment growth in total services and in private services. Since the latter account for the largest share of employment in old and new member states alike, the fact that labour market institutions hamper their development in the enlarged EU is of serious concern. On the other hand, the results indicate that the employment in mixed services is not sensitive to labour market institutions. This could, to a certain extent, be explained by the rigidity of jobs in the two largest groups of mixed services (i.e. health and education), resulting from more favourable employment protection and from the importance and sensitivity of those services to the population (risky fluctuations in employment). Nevertheless, such properties of mixed services might provide grounds for poor efficiency that need to be addressed by adequate policy governance. Further, this category of services has been identified as the least sensitive to the set of variables tested. Lastly, belonging to the EU15 'club' seems to be a relevant determinant stimulating total service employment and job expansion in public and mixed services. The latter reflects the social and demographic changes in the EU15, as well as the increasing role of knowledge. Furthermore, it appears that the past socio-economic system and the changes undertaken in the EU12 since the beginning of the 1990s bear an influence on the evolution of public-related service activities in those countries. Thus, the empirical estimations suggest that 'history matters' in explaining the dynamics of service employment growth across the enlarged EU, which conveys an important message for policy shaping.

Further research is needed in order to explore other model specifications for different service categories and the role played by country-specific effects as a potential explanatory factor. Some other variables may also be relevant determinants of service employment (e.g.

product market regulations, FDI in services, foreign affiliate sales of services, tax on service activities, role of shadow economy employment, etc.) that could not be included in the analysis so far due to data constraints. Resulting from the increased integration of service activities into business processes in the private and public sectors, a more challenging avenue for future research refers to the factors that determine employment growth in service professions with different skill requirements. To conclude, additional work may be conducted in order to refine the categorisation of service activities into public, private or mixed as well as to get further insights of the particular determinants of employment in specific service subsectors.

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APPENDIX 1: Data description: definition and sources

Total services employment share: Ratio between number of employees in NACE sectors G to P and total number of employees (multiplied by 100, logarithm). Source: EU KLEMS database and Eurostat.

Private services employment share: Ratio between number of employees in NACE sectors G to K and total number of employees (multiplied by 100, logarithm). Source: EU KLEMS database (and Eurostat .

Public services employment share: Ratio between number of employees in NACE sectors L to P and total number of employees (multiplied by 100, logarithm).. Source: EU KLEMS database and Eurostat.

Private services1 employment share: Ratio between number of employees in NACE sectors G, H, 61-63, J, K and total number of employees (multiplied by 100, logarithm).. Source: EU KLEMS database and Eurostat data base.

Public services1 employment share: Ratio between number of employees in NACE sector L and total number of employees (multiplied by 100, logarithm).. Source: EU KLEMS database and Eurostat.

Mixed services employment share: Ratio between number of employees in NACE sectors 60, 64, M, N, O, P and total number of employees (multiplied by 100, logarithm). Source: EU KLEMS database and Eurostat data base.

GDP per capita: gross domestic product per head at constant prices and current PPPs (divided by 1000, logarithm, smooth series obtained by Hodrick and Prescott filter). Source: World Bank, WDI.

Cycle: detrended GDP per capita (divided by 1000, logarithm obtained by Hodrick and Prescott filter). Source: World Bank, WDI.

Productivity Gap: logarithm of the ratio (multiplied by 100) of productivity in services to productivity in manufacturing (both index numbers, base=1995). Productivities are computed as real value added over number of employees. Source: authors' computation on EUKLEMSN Database and Eurostat.

Government Consumption: General government final consumption expenditure, % of GDP (logarithm). Data are in constant 2000 U.S. dollars. Source: World Bank, WDI.

Urbanization: Urban population, % of total (logarithm). Source: World Bank, WDI.

Female participation: Female labor force as a percentage of the total labour force (logarithm). Source: World Bank, WDI.

Household Consumption: Household final consumption expenditure, % of GDP (logarithm). Source: World Bank, WDI.

Services trade specialization: ratio of trade (exports plus imports) in services and total trade (multiplied by 100, logarithm). Source: World Bank, WDI.

FDI: Foreign direct investment, net inflows (BoP approach, current US\$, in), logarithm. Source: World Bank, WDI.

Human capital: Labor force with secondary education (% of total), logarithm- Source: World Bank, WDI.

Tax revenue: Total tax revenue as percentage of GDP (logarithm). Source: World Bank, WDI.

EPL: employment protection legislation on contracts, index. For Estonia and Slovenia the only value available is for 2008, this is taken as constant for the previous years. Source: OECD.

Union density: ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners (logarithm). Source: OECD.

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